ABSTRACT

*Sarcostemma acidum* is widely used by the folk people in the treatment of verity of diseases and disorders. The present study was therefore carried out to provide requisite pharmacognostic details about the plant. Methods: macroscopy, microscopy, physicochemical analysis, preliminary phytochemical screening and other WHO recommended parameters for standardization were performed. Result: A perennial leafless, jointed shrub with green, cylindrical, fleshy glabrous, twining branches having milky white latex, taste bitter; Flower white or pale greenish white with fragrant odour. The microscopy reveals dicotyledonous plant having circular vascular bundles in stem, absence of pith in root and anomocytic type of stomata on stem bark. Other physicochemical tests like moisture content, ash value, extractive values were determined and Preliminary phytochemical screening showed presences of carbohydrates, triterpenoids, phytosterols, saponins and lignins. Extraction of chemical constituents and chromatographically analysis (TLC) were performed. Conclusions: The microscopic using histological identification, microscopic constants, and other physico chemical examinations of *Sarcostemma acidum* can be used as a rapid, inexpensive and botanical identification technique is useful in standardization, hence would be of immense value in authentication of plan.

INTRODUCTION

*Sarcostemma acidum* is an Indian traditional medicinal plant. It has been categorized as candidate of *Soma* plants by various authors. It was said that Soma (Somlata) was used to prepare 'Som ras' (Rejuvenating drink) by Aryans. The original source of 'Soma' plant is a mystery that has been debated by the vedic and botanical scholars for more than two & a half centuries. It is found wildly in India, Pakistan and Europe etc. It is distributed in various parts of India. It is found in dry rocky places in Bihar, Bengal, Konkan, Deccan, Tamil Nadu, Maharashtra, Madhya Pradesh and Kerala. The plant is bitter, acrid, cooling, alternate, narcotic, emetic, antiviral and rejuvenating. Chemical constituents - Malic acid, Succiacid, Reducing sugar – sucrose, Traces of tannin, Alkaloids, Phytosterols, Alpha & beta amyrins, Lupeol & lupeol acetate, Beta sitosterol1-3. Chemical constituents of *Sarcostimia acidum* growing in China – Lignans ¬ Sacidumflignan-A, Sacidumflignan-B, Sacidumflignan-C, Sacidumflignan-D, Degraded lignans derivative- Sacidumol-A, Sacidumol-B, (+) Pinoresinol, 9 alpha hydroxyl pinoresinol ,Perforatic acid, Peucenin -7 O methyl ether 4 Sarcidumitol (2,6 dideoxy- disacchariditol) 5 Antifertility, anti-microbial and in vitro anti-inflammatory 6,7,8 activities have been reported on this plant.

Traditional uses in different areas of India

• Latex is applied on wounds and cuts in Bidhar district of Karnatakah.

• Three drops with honey taken orally thrice a day for chronic ulcer in Andra Pradesh Sirumalai Hills10

• A dry powder of the plant is being used in the form of decoction to treat earache in babies. Milky latex is prescribed to the lactating mother in Purulia district of West Bangal.11

• In digestive disorder, scabies, skin disease, poisoning, cardiac disease, fever, cold, thirst Mental disorders and dog bite in Karnataka12

• The plant stem is used to cure bone fracture in Madhya Pradesh.13

• Stem juice mixed with water is given in rheumatism, arthritis, and joints pain. Dry powder with Mustard oil is applied externally for treating earache in Nimar region of Madhya Pradesh14

• Stem juice is used as ear drops during earache, for treating mad dog bite - extraction of stem and grass of garika (cynodon dacrylon) with turmeric is applied and tied with bandage over the bitten area twice for two weeks. Milky latex used as lotion by the ethnic people of Krishna district, Andhra Pradesh.15

• Roots in snake bite and taken as an infusion in dog bite cases, latex to kill white ants (termites); dry stem as emetic in Thar Desert.16

• Used as eye drops in Nallamala forests of Andra Pradesh.17

• Water solution of pulpy mesocarp given as nasal drops (externally remedy) in epilepsy by yanadis community in Cuddapah district, Andra Pradesh.18

*Author for correspondence*
Fig. 1: Plant and Flowers of Sarcostemma acidum

Fig. 2: Flower parts, Flower diagram and Flower formula of Sarcostemma acidum
Table 1: Physicochemical Parameters of Sarcostemma acidum stem

<table>
<thead>
<tr>
<th>Physicochemical Parameters (% W/W)</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Moisture Content</td>
<td>80.23</td>
</tr>
<tr>
<td>Ash Value</td>
<td></td>
</tr>
<tr>
<td>Total ash</td>
<td>12.125</td>
</tr>
<tr>
<td>Acid insoluble ash</td>
<td>4.5077</td>
</tr>
<tr>
<td>Water soluble ash</td>
<td>1.2595</td>
</tr>
<tr>
<td>Extraction Value</td>
<td></td>
</tr>
<tr>
<td>Alcohol soluble</td>
<td>7.424</td>
</tr>
<tr>
<td>Water soluble</td>
<td>12.4</td>
</tr>
<tr>
<td>Ether soluble</td>
<td>3.784</td>
</tr>
<tr>
<td>Decoction</td>
<td>13.66</td>
</tr>
</tbody>
</table>

- 100 ml of stem bark juice is given to cattle once in a day for 5–6 days as Galactagogue in Sariska region of Rajasthan.

**MATERIAL AND METHOD**

Collection, identification and authentication of specimen: The plant specimen for the proposed study was collected from forest of Kailashpuri near Udaipur & authenticated by Dr. Satish Kumar Sharma, assistant conservator of forest & wildlife – Fatahpura, Udaipur.

Macroscopy: The collected plant was washed, cleaned and dried for further use. The following macroscopic characters of the fresh plant (stem, root and flower) were noted: color, odor, taste, size and shape and surface.

Microscopy: The free hand thin transverse section of stem, root and longitudinal section of bark of stem were treated with different staining agent and observed for general and specific microscopic characteristics.

Physicochemical parameter: The various physicochemical parameters such as total ash, acid insoluble ash, water soluble ash, moisture content, extractive value (water, alcohol, ether & decoction) have been studied.

Preliminary phytochemical analysis: For the preliminary phytochemical analysis, 10 gm of powdered stems was extracted with ethanol, chloroform & ether successively using soxhlet apparatus and the aqueous extract was prepared by decoction technique. The extracts were concentrated under vacum rotary evaporator, dried and weight. Each extract was tested for presence of different phytochemicals.

Extraction of chemical constituents and chromatography: According to preliminary phytochemical analysis, chemical constituents were extracted and performed thin layer chromatography.

Extraction process: The powered drug was homogenized with methanol: water (4:1) for 30 minutes and filtered, the filtrate was acidified (dilute sulphuric acid) and extracted exhaustively with chloroform then got two layer (acidic & chloroform) after 10 minutes the chloroform layer was separated with separating funnel and examined under thin layer chromatography (TLC).

Solvent system: Firstly, TLC was performed in pure solvents based on trial and error method. Then different combinations of solvent systems were tried for best separation of constituents. By optimization of the solvent system, chloroform: methanol (9:1) was found the best system for the resolution of various component.
Observation and interpretation of chromatogram: The spots produced were observed in daylight, under short and long wavelength of ultraviolet light. RF values of spots were calculated.

RESULT
Macroscopy: It is a perennial leafless, jointed trailing shrub, fleshy glabrous, twining branches having milk white latex, leaves reduced to scales, opposite, color - green, shape - cylindrical, length – 2 to 4 meter, diameter of stem 0.5 to1cm; Root- depth only 5 to 8 inch with 3 to 5 sub root branches, color- brownish; Flowers- actinomorphic, color- white or pale greenish white, odor-fragnant, in umbels on branch extremities, diameter- 0.8 to 1cm. sepals(5), petals(5) attached with androceium (stamens-5), gynoceium (ovary-2), androciuim and
Fig. 5: Transverse section of root of *Sarcostemma acidum* (100x & 400x)
Stem- Transverse section of *Sarcostemma acidum* showed gynocium are attached with the help of stigma (5) Figure - 1 to 2. Microscopy: Plant stem, root and bark were studied microscopically.

**Fig. 6: Longitudinal section of bark of Sarcostemma acidum (100x, 400x &1000x).**

Table 2: Phytochemicals present in different extractions of *Sarcostemma acidum* stem

<table>
<thead>
<tr>
<th>Phytochemicals</th>
<th>Decoction</th>
<th>Ethanol</th>
<th>Chloroform</th>
<th>Ether</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbohydrates</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Phytosterols</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Terpines</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Saponins</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Lignins</td>
<td>Present in T S of plant stem</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

**In U.V. light**

**Fig. 7: Thin Layer Chromatographic plate with color spots of solute run**

gynocium are attached with the help of stigma (5) Figure - 1 to 2. Microscopy: Plant stem, root and bark were studied microscopically.

Table 3: Chromatographic study of *Sarcostemma acidum* stem

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Extraction</th>
<th>Solvent System</th>
<th>Solvent run(cm)</th>
<th>Solute run(cm)</th>
<th>RF value(cm)</th>
<th>Color of Spots</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Isolated chloroformic extract</td>
<td>Chloroform : Methanol (9 : 1)</td>
<td>6.0</td>
<td>4.0</td>
<td>0.48</td>
<td>Blackish green</td>
</tr>
<tr>
<td>2</td>
<td>chloroformic extract</td>
<td>Methanol</td>
<td>12.4</td>
<td>7.50</td>
<td>0.60</td>
<td>Light yellow</td>
</tr>
<tr>
<td>3</td>
<td>extract</td>
<td>(9 : 1)</td>
<td>9.6</td>
<td>0.77</td>
<td>Brownish pink</td>
<td></td>
</tr>
</tbody>
</table>
cells were arranged in 5 to 6 layers without intracellular space. A single layer of endodermis cells were seen separating cortex and vascular bundles. (Figure 3) Vascular bundles were seen in ring shape (Fig.4b) and cambium cells layers (2 to 3) were arranged separating phloem and xylem tissues. Starch grains were also present near phloem tissues. Medullary rays and pith were found to make central part of stem.(Figure 4 c & d)

Root- Transverse section of *Sarcostemma acidum* showed three parts 1. Outer most layer 2. Cortex 3. Vascular bundles. Outer most layer ‘cork’ was thick walled and rectangular shape parenchymal cells layers (5 to 6) were seen underneath the cork which made cortex of root. Phloic fibers and phloem were arranged under parenchyma. Cambium layers were seen separating phloem and xylem. Xylem was scattered in between conjunctive tissues and covered large part of vascular bundles. Absence of pith and presence of secondary growth in root were also seen. (Figure 5 d & e)

Bark

Anomocytic or Ranunculaceous type stomata were found in longitudinal section of bark. Two guard cells and five subsidiary cell were clearly seen.(Figure 6)

Physicochemical parameter- Various physicochemical parameters are presented in table No.- 1

Preliminary physicochemical analysis- The aqueous extract (decoction) of stem shows presence of carbohydrates, sucrose, phytosterol, terpines and saponins. Ethanolic extract shows presence of carbohydrates ( reducing & nonreducing), phytosterol, triterpinoids. Chloroform extract shows presence of steroids & triterpinoids. In table No. - 2

Chromatographic study: Results of TLC was tabulated in Table No.-3

**DISCUSSION**

The Pharmacognostic studies provide useful information to identifying and authenticating of medicinal plants. According to the microscopic characteristics of *Sarcostemma acidum* was found that it is dicotyledonous plant. These pharmacognostic details of *Sarcostemma acidum* would be helpful for further scientific studies. *Sarcostemma acidum* (somlata) is needed to be conserved because it is categorized in threatened vulnerable plant species.

**REFERENCES**